REMARKS/ARGUMENTS

Claims 15, 23, 24, and 26 are being amended as described on pages 10 (next to last paragraph) and 14 (second paragraph) of the present application. The amended claims make it clearer that the claimed elements and methods utilize a radiation-sensitive coating that produces free radicals upon exposure to imaging radiation, and such free radicals then cause the desired polymerization of the monomers containing phosphate groups. It is believed that the pending claims are patentable over the combined teaching cited in the Office Action for the following reasons.

Rejections Under 35 U.S.C. §103

I. Claims 15-23 and 26-27 have been rejected an unpatentable over US Patent Application Publication 2003/0162130 (Murota) in view of EP 0 738 928B1 (Kazama et al.) and US Patent 4,019,972 (Faust).

II. Claims 24-25 have been rejected as unpatentable over Kazama et al. in view of Faust.

Both rejections are respectfully traversed, and each will be addressed in detail after a brief explanation of the presently claimed invention.

Applicants' Invention:

The presently claimed invention relates to radiation-sensitive elements and methods for their use to prepare lithographic printing plates with aluminum substrates. These substrates are treated prior to coating the radiation-sensitive composition by electrochemical roughening using a hydrochloric acid electrolyte, and then various optional other treatments.

It has been found in the literature that while roughening can be carried out using either hydrochloric or nitric acid, strong adhesion of the overlying coatings to an aluminum substrate is highly dependent upon how the aluminum substrate is treated prior to coating. If adhesion is poor, the run length is shortened as the quality of printed copies from the printing plate quickly deteriorates. Some coated layers adhere best to aluminum substrates treated with nitric acid, but the use of nitric acid is a greater ecological concern as well.

The problem of poor adhesion has also been addressed in the literature by modifying the polymer binders or other components in layers coated

on the aluminum substrate. These efforts have had mixed success. Despite those efforts, more improvements have been needed, and the present invention is directed to that purpose, i.e. to improve adhesion to specific aluminum substrates, namely those that have been electrochemically roughened with hydrochloric acid. Moreover, while adhesion is a primary goal, the skilled artisan has been concerned about achieving this improvement without sacrificing high photosensitivity (especially spectral photosensitivity in the UV and violet regions of the spectrum), storage stability, and quick start-up and high run length on the printing press.

The improvement is provided with the present invention by using a unique combination of components in the overlying radiation-sensitive, free radical-producing coating. These components include a mixture of a free-radical polymerizable monomers having phosphate groups, and a combination of a spectral sensitizer and co-initiator that together produce free radicals upon radiation-exposure, and a biuret oligomer defined by formula (V) in Applicants' claims and disclosure. Species of each of these components are known in the art in some context or field of technology. But, they have not been taught or demonstrated in Applicants' unique claimed combination in the field of lithography.

What Applicants found however, is that no one had found that by putting all of these components together, excellent adhesion to aluminum substrates could be obtained without loss of other desired properties. Moreover, they found that these improvements are achieved only if the aluminum substrate has been treated with hydrochloric acid. They were not found when the substrate was treated with nitric acid (see Applicants' discussion of Comparative Example 7 on page 34 of the application). Undesirable toning, which is undesirable ink receptivity in the non-imaged areas, was observed when a nitric acid-treated substrate was used with the same radiation-sensitive composition. Applicants did not expect this difference based on the general understanding in the art relating to the various roughening techniques. Comparative Examples 1-6 (pages 32-34) show that if one or more of the four recited components are omitted from the radiation-sensitive coating, sensitivity is reduced, and developability or run length was reduced. Comparative Example 6 is particularly noteworthy as the biuret (Compound E) of the claimed invention (compound 11) was replaced with

compound 12 that is outside the scope of this invention. Not only did the omission of the biuret affect run length, but it also photospeed and developability were reduced (see Table 2, page 32). That the omission of the biuret would affect so many properties (not just adhesion) was surprising to the Applicants.

Thus, from this showing of unexpected results, Applicants were surprised that the combination of components in their radiation-sensitive coating would provide the noted advantages when coated on a hydrochloric acid-treated aluminum substrate, but not on a nitric acid-treated aluminum substrate.

Rebuttal of Rejection I:

The Office Action has applied Murota with Kazama et al. and Faust against Applicants' Claims 15-23 and 26-27. These rejected claims have several features in common, namely the specific hydrochloric acid-treated aluminum substrate and the recited components of the radiation-sensitive free radical-producing coating applied thereto.

The Office Action cites Murota as teaching a photosensitive lithographic printing plate with a photosensitive layer that is allegedly equivalent to that recited in Applicants' claims. Murota teaches the use of an aluminum substrate. The Office Action points out that Murota [0119]-[0120] teaches the use of graining with hydrochloric acid, but the Office Action neglects to point out that nitric acid electrochemical graining is taught as equivalent in the same paragraphs. In fact, Murota demonstrates only the use of nitric acid in the examples [0221] and this could be taken by a skilled artisan as a preference.

The Office Action does admit that Murota fails to teach all of the components in Applicants' radiation-sensitive coating, but then cites a dental adhesive publication, Kazama et al., for its teaching of a coumarin dye, an acid-generating iodonium salt, and polymerizable monomers with phosphate groups in a photosensitive dental adhesive. The purpose of such an adhesive, of course, is to adhere a composite resin to teeth (enamel or dentin), which are clearly not aluminum-based substrates. That Kazama et al. is cited at all is likely due to the speculative (but not demonstrated) mention that the described photosensitive materials could be used to form plates for printing [0001]. However, it is also clear that Kazama et al. is directed to photosensitive compositions that generate an acid for polymerization, otherwise an acid-generating compound would not be

specified [0028]-[0049] and [0054]. It does not explicitly describe chemistry that will produce free radicals. Kazama et al. also teaches that polymerizable monomers can have either carboxylic acid or phosphoric acid groups. No preference is stated in [0063]-[0067]. The Examples in Kazama et al. show the use of polymers with both types of acidic groups [0086] but again no preference is apparent.

The Office Action also recognizes that neither Murota nor Kazama et al. teaches the use of biuret compounds and cites Faust as showing a photopolymerizable composition containing such compounds. Faust is directed to photocopying compositions that can be coated onto various metals, but particularly onto copper supports. There is no mention or suggestion of an aluminum substrate that has been grained with hydrochloric acid. Moreover, the composition of Faust utilizes the biuret compounds as the polymerizable compounds. There is no teaching of additional free radical polymerizable monomers having phosphate groups. Moreover, there is no mention of Applicants' free radical-generating co-initiators, i.e. onium compounds, hexaarylbiimidazole compounds, and trihalogenomethyl compounds. There is further no mention of Applicants' free radical-generating spectral sensitizers.

After pointing out where each individual reference teaches one or two of Applicants' components, the Office Action concludes (page 5) that it would have been obvious to one of ordinary skill in the art at the time of the invention to include the polymerizable monomers with biuret groups of Faust in the polymerizable composition of Kazama et al. in order to obtain compositions that are distinguished by their non-volatility, resistance to handling, and flexibility.

Further, the Office Action concludes that a modified Kazama et al would teach a polymerizable composition equivalent to the radiation sensitive coating of the claimed invention since the modified Kazama et al. composition would have sensitivity for visible rays and exhibit excellent adhesiveness. And thus, it is finally concluded, it would be obvious for one of ordinary skill in the art to use the polymerizable composition of a modified Kazama et al. as a photosensitive layer in the lithographic printing plate of Murota in order to provide sensitivity for visible rays and excellent adhesiveness.

Applicants do not believe these conclusions. They are not supported in the Office Action by technical reasoning, as required under Section 103 and the recently decided *KSR* Supreme Court decision, as to why a skilled artisan would do what the Office Action says she/he would do, that is, making the various leaps of combining Faust with Kazama et al., and then using the modified Kazama et al. with Murota, and *viola*, have the presently claimed invention. All that are stated in the Office Action are unsupported conclusions.

What is apparent from the statements in the Office Action is that three different references have been chosen, each individually teaching one or two of Applicants' radiation sensitive coating components, and using Applicants' claims and disclosure as a "roadmap", the combination of the various components has been considered an obvious action that a skilled artisan would take to obtain Applicants' claimed advantages.

Applicants respectfully disagree with this examination approach and its results.

First of all, the Office Action has failed to address what the level of skill would be in the art of lithography as required by Section 103 and the decades old, but recently affirmed, *Graham v. John Deere* case. A skilled worker in this art is not one who has recently graduated from college with a Bachelor of Science degree, or even one with a Master of Science degree in Chemistry or Engineering. Rather, a typical skilled worker in this art usually has a Ph.D. degree in an appropriate scientific field and several years of experience working in the field, or has lesser education but a decade or two of working in this field. One having this level of skill would not make the casual connections that are made in the Office Action because the teachings of the cited references tell a skilled worker much more than has been stated in the Office Action and would actually lead her/him away from the presently claimed invention. The lead inventor for this application. Dr. Harald Baumann, has a Ph.D. degree in Chemistry from the University of Merseburg of Applied Sciences in Merseburg, Germany. He is certainly qualified as one skilled in the art and upon his review of the cited art, has certainly taken a contrary view of that art than that portrayed in the Office Action.

A number of judicious choices are necessary to arrive at Applicants' claimed invention from the cited art, in view of the need for solving the problems noted above without other properties suffering a loss.

First of all, the skilled artisan must decide what type of aluminum substrate should be used, and how it should be electrograined. While Murota mentions the use of either hydrochloric acid or nitric acid, the preference in Murota is the use of nitric acid. Applicants have demonstrated that, in the present invention using the specific radiation sensitive, free radical generating coating, the use of nitric acid is undesirable (Comparative Example 7).

Secondly, even if Applicants guessed correctly from Murota that hydrochloric acid would be better than nitric acid, going against Murota's preference, they would have to determine the best combination of free radical generating and polymerizable components to achieve great adhesion without loss of photosensitivity, run length, and other properties. Since they wanted to find an imaging system that provides and uses free radicals and not acid-generation, they would not follow any teaching of Kazama et al., especially since they are trying to adhere coatings to aluminum not tooth enamel and dentin.

Thirdly, even if they consulted Kazama et al., they would have to make a lot of other judicious choices—which acid generating initiators might be useful free radical generators? Kazama et al. doesn't provide any guidance on that. Which acid-polymerizable monomers in Kazama et al. might be free radical polymerizable monomers? Kazama et al. also fails to provide guidance for that choice. Moreover, even if Applicants happened to try the monomers of Kazama et al. in their free radical system, which ones do they choose—those with carboxylic acid groups or those with phosphate groups? Kazama et al. does not give a preference and thus a skilled artisan is likely to choose carboxylic acid monomers as readily as the others. Yet, Applicants did not find the carboxylic acid monomers useful. They found the use of carboxylic acid monomers in place of the monomers with phosphate groups to provide no better results that Comparative Example 3 (Table 2, pages 32-34, developability of aged plates) in which no acidic-containing polymer was used. Such polymers are the standard adhesion promoters in the industry, so they were the obvious materials to try, but they performed poorly in the context of the presently claimed invention.

Lastly, even if they made all of the "right" choices from Faust and Kazama et al., without any reasons for doing so, still another choice must be made to combine all of the chosen monomers, sensitizers, coinitiators, and biuret monomers in a free radical-producing composition, and to apply it to a hydrochloric acid-treated aluminum substrate instead of a nitric acid-treated substrate. As noted above, the preference in Murota is to use nitric acid. Moreover, Applicants found the use of that treatment, with their specific free radical producing composition, on a nitric acid-treated substrate to be unsatisfactory (Comparative Example 7).

Thus, the teaching of the art directs a skilled worker away from the claimed invention, and even if by some fortuitous chance, the right choices were made, there is no certainty that the combination of features would work better one a hydrochloric acid-treated substrate compared to a nitric acid-treated substrate. Applicants have demonstrated that there is unpredictability in putting all of the claimed features together, and thus they have demonstrated patentability of the claimed invention. For these reasons, Rejection I should be withdrawn.

Rejection II:

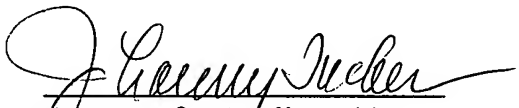
Composition Claims 24-25 have been similarly rejected over Kazama et al. and Faust. Applicants' arguments presented against Rejection I are equally applicable here except for the arguments relating to the treated aluminum substrate as that feature is not present in Claims 24-25.

For the sake of brevity, Applicants would refer the Examiner to their previous arguments. Applicants submit that there is a lack of technical reasoning as to why anyone in the dental field would put the biuret monomers of Faust in the acid-catalyzed photosensitive compositions of Kazama et al. There are only unsubstantiated opinions provided in the Office Action (page 12). Moreover, there is no technical reasoning supplied that would convince a skilled artisan that the acid catalyzed compositions are equivalent to Applicants' free radical producing compositions, or why one would suggest the other. There are still too many judicious choices that a skilled artisan like Dr. Baumann must make before Applicants' combination would be conceived or reduced to practice. That unique combination can only be derived from Kazama et al. and Faust if Applicants' application is used as a guide to putting specific combinations

together. That is clearly an improper approach to examination under Section 103 as the courts have stated numerous times. For these reasons, Rejection II should be withdrawn.

In view of the foregoing amendments and remarks, reconsideration of this patent application is respectfully requested. A prompt and favorable action by the examiner is earnestly solicited.

Respectfully submitted,



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